

**Title:** Effect of fluoride conversion coating on corrosion of behavior of mg-ca-zn alloy

**Author/Authors:** Shahram Ghaedi Faramoushjan, Farhad Chinaei, Hamid Reza Bakhsheshi-Rad, Mohd Hasbullah Idris

**Abstract:** Magnesium and its alloys have been received huge attention as new kind of degradable biomaterials. However its application hindered by poor corrosion resistance fluoride conversion coating was performed due to improve the corrosion resistance of Mg-Ca-Zn alloy. In the present work corrosion of behaviour and degradation behaviour of fluoride treated Mg-Ca-Zn alloy were investigated. Microstructural evolutions were characterized by scanning electron microscopy and energy dispersive x-ray spectroscopy. The corrosion resistance was examined in vitro by potentiodynamic polarization and immersion test in Kokubo solution at room temperature. The coating characterization indicated that the dense and uniform film with 6  $\mu\text{m}$  thickness consists of MgO and MgF<sub>2</sub> formed on the alloy. Polarization tests recorded a significant reduction in the corrosion current density from 188  $\mu\text{Acm}^{-2}$  in bare Mg-Ca-Zn to 6.11  $\mu\text{Acm}^{-2}$  in fluoride treated alloy as a result of formation MgF<sub>2</sub> protective layer. The in vitro degradation tests showed that the average weight loss of the untreated specimens significantly higher than that of fluoride treated Mg-Ca-Zn alloy. The results revealed that the fluoride conversion coating noticeably improve the corrosion resistance of Mg-Ca-Zn alloy resistance of Mg in Kokubo solution.